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ABSTRACT

In an effort to achieve ethnic parity for underrepresented minorities at the University of New Mexico College of Engineering, precollege and undergraduate programs were developed to recruit and retain Hispanic and American Indian students. The Math, Engineering, and Science Achievement (MESA) program is a coherent, longitudinal program organized to increase awareness and motivation in bright minority Algebra I students and to support their interest through high school graduation and university matriculation. It provides such student services and activities as short on-campus college/engineering orientation programs; tutoring; academic, university, and career counseling; field trips; summer enrichment and employment programs; and scholarship incentive awards. The undergraduate program supports minority students through the Hispanic Engineering Professional Advisory Committee and the Hispanic Engineering Organization, the Native American Program/College of Engineering, and the College of Engineering tutoring program available to all engineering freshmen. Comprehensive tabular data indicate student ethnic breakdowns for program participation, college enrollment, degree received, and sex. Figures for corporate contributions and federal funding are included. (MM)

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THE REPORT OF ENGINEERING SPECIAL PROGRAMS

JULY 1, 1983-JUNE 30, 1984

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By

TOM CUMMINGS, DIRECTOR

July 1984

RC 015004

THE REPORT OF ENGINEERING SPECIAL PROGRAMS

JULY 1, 1983-JUNE 30, 1984

TOM CUMMINGS, DIRECTOR

INTRODUCTION

MISSION STATEMENT: To achieve ethnic parity for underrepresented minorities at the University of New Mexico College of Eningeering in 1985.

	UNM/COE 1983-84 (Fall 1983)	(Spring 1984)	NM Population (1980 Census)
Hispanic	451	504	36.6%
Indian	48	48	8.1%
Black	22	22	1.8%
Total Minority	521	594	46.5%
Women	532	519	51.0%

1. Our goals are defined in terms of recruitment and retention, pre-college and undergraduate.

2. Our strategies combine involvement at the national level plus intensive work in New Mexico.

3. Special Programs works under the guidance of the Student Services Faculty Advisory Committee: 1983-84 Membership:

   Professors: EE - Don Neamen, Chair
   CE - Bruce Thompson
   ME - Bill Gross
   CHE - Ebtisam Wilkins
   CS - Edgar Gilbert

NATIONAL INVOLVEMENT: The Director of Special Programs is involved in the following organizations:

1. American Society for Engineering Education (ASEE): Special Programs is active in the annual meeting of ASEE's College- Industry Education Conference Relations With Industry (CIEC/RWI section). This allows us to keep old corporate contributors aware of our problems and progress and to cultivate new corporate contacts.

2. National Association of Pre-college Directors (NAPD): Consists of 16 pre-college programs, Caroline Chestnutt, SECME, Atlanta, Chair. NAPD meets in conjunction with CIEC in the Spring and NACME in the Summer. Participation in NAPD allows for sharing of ideas and resources and better access to federal and corporate support.

3. The National Association of Minority Education Program Administrators (NAMEPA): Consists of the directors of college-level minority programs with an emphasis on retention. The country is organized into five regions. Region D includes North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, Texas, New Mexico, Colorado, and Arizona. Officers: Chair, Tom Cummings, UNM; Chair-elect, Winona Shilling, University of Oklahoma; past-chair, Betsy Yost, NMIMT. NAMEPA meets jointly twice annually with CIEC/RWI and and NACME.

4. The National Action Council for Minorities in Engineering (NACME): Combines several 1970's minority programs. Lloyd Cook, Union Carbide, President Emeritus; Bob Finnell, former Executive Director of MESA, California, President. NACME's fourth annual forum in June provided access to corporate resources and sharing of resources and information.

There is a great deal of overlap in memberships, missions, goals, and strategies among NAPD, NAMEPA, NACME, and CIEC/RWI which makes joint meetings a very effective means of communication.

One measure of the effectiveness of the national effort is degrees earned in 1982-83. Table 1 lists degrees earned (data from Engineering Education, 1984 pp 640 - 645. Hispanic students are increasing their representation nationally; American Indian students' representation continues to be minimal.

TABLE 1

	B.S.	M.S.	ENGR.	DOCTORATE
Total	72,471 (100%)	19,909 (100%)	236 (100%)	3023 (100%)
Black	1,862 (2.6%)	258 (1.3%)	3 (1.3%)	19 (0.6%)
Hispanic	1,883 (2.6%)	306 (1.6%)	4 (1.7%)	41 (1.4%)
Indian	97 (0.1%)	16 (0.1%)	- 0 -	- 0 -
Asian	3,098 (4.3%)	1,283 (6.5%)	11 (4.7%)	173 (5.7%)
Foreign	6,151 (8.5%)	5,097 (25.9%)	48 (20.3%)	1192 (39.4%)
Women	9,566 (13.2%)	1,782 (9.1%)	14 (5.9%)	142 (4.7%)

I. UNM PRE-COLLEGE PROGRAMS

It is increasingly obvious that successfull retention depends on effective pre-college preparation which in turn involves awareness and motivation. In the past we have relied on visits to schools and correspondence tied to a series of summer programs. We are currently emphasizing a coherent, longitudinal program organized around bright minority Algebra I students to work with them through high school graduation and university matriculation. This program is the MAth, Engineering, and Science Achievement (MESA) program, Patrick Lopez, Director, UNM MESA Center.

A. PREP: Patrick Lopez, Coordinator, 1983-84. The Pre-Engineering Program is a Department of Energy-funded two-week program which brings forty rising ninth and tenth grade students on campus for two weeks of motivational and awareness activities. Funding for 1983-84 = $21,000.

B. MITE: Lila Bird, Coordinator, 1983-84. The Minority Introduction To Engineering (formerly UNITE) is a one-week ABET-funded ($5000) program which brings twenty rising seniors onto compus for awareness and motivational activities.

C. AFITE: The Air Force Introduction to Engineering program brings 135 rising ninth graders onto campus for a week of motivational activities. As two of its three week sessions occur in July, it will be included in the 1985 annual report. $25,000 from KAFB/AFWL supports AFITE.

TABLE 2

PREP PARTICIPANTS 1984

	MALE	FEMALE	TOTAL
Indian	5	7	12
Hispanic	12	11	23
Black	1	1	2
Asian	1	0	1
TOTAL	19	19	38

MITE PARTICIPANTS 1984

	MALE	FEMALE	TOTAL
Indian	5	2	7
Hispanic	4	7	11
Anglo	1	1	2
TOTAL	10	10	20

D. NMMESA: 1983-84 was the New Mexico Mathematics, Engineering and Science Achievement program's second year. MESA stresses teams within participating high schools: principal, math chair, science-chair, English-chair, and counselors. Parental organization is vital. New Mexico MESA has two centers in 1983-84. They are UNM Center, Pat Lopez, Center Director; and NMIMT Center, JoAnn Sarracino, Center Director. Table 3 summarizes MESA enrollments.

The New Mexico Math, Engineering, and Science Achievement Program works with Junior and Senior minority high school students through a MESA advisor in each participating school. Upon graduation, matriculating MESA participants will utilize minority retention programs which provide a wide-range of supportive services through networking corporate, government, and universities and colleges. In 1983-84, we served over 250 students. In 1984-85, we plan to reach over 400 students.

The NMMESA office, headquartered at the University of New Mexico, Albuquerque, has overall responsibility for the statewide MESA effort. While a governing Board, Ray Powell, Sandia National Labs, Vice President, Chair, sets general policies, day-to-day management of the program is conducted by Tom Cummings, Executive Director, and Pat Lopez, UNM Center Director.

1. Student Services and Activities: MESA provides participating students with five major activities that are designed to enrich their regular educational programs.

   a. Tutoring: Professional engineers, scientists, and college students tutor MESA students so that they understand mathematical and scientific concepts and maintain high grade point averages. Advanced MESA students who have excelled in their courses are paid to assist in the tutoring of younger MESA students.

   b. Academic, University & Career Counseling: Special counseling aids MESA students in the selection of their high school program, their choice of universities to attend, and in the completion of university application forms and resumes. Speakers from a variety of engineering and technical fields provide practical information about career opportunities in their specialty areas.

   c. Field Trips: MESA students have further contact with engineering and physical science professionals and technical projects during visits to industrial plants, research centers, universities, engineering firms, computer centers, and other sites where technical professionals are employed.

   d. Summer Enrichment and Employment Programs: Students are encouraged to participate in enrichment programs in mathematics and science during the summers following grades nine through eleven. Meaningful summer job positions in industry, engineering laboratories, and the like are available to some MESA students after their junior and/or senior years in high school.

e. Scholarship Incentive Awards: Students who maintain a B average in advanced-level college preparatory mathematics, science, and English courses may earn scholarship support while still in high school.

2. UNM Center Pilot Year - 1983-84: The UNM Center served three school districts--the Albuquerque Public Schools, Bernalillo Public Schools, and West Las Vegas High School. Mary Ann Esquibel, Science Curriculum Coordinator, coordinated the program with the Albuquerque Public Schools. In Bernalillo, we worked directly with Charles Aguilar, Principal of Bernalillo Junior High School. In West Las Vegas, we worked directly with Gil Sena, Principal, West Las Begas High School.

a. Albuquerque Public Schools: The program worked through an advisor at each of five high schools.

- Albuquerque High School: Jill Snyder, Math Teacher
- Manzano High School: Donna Clauss, Math Teacher
- Rio Grande High School: Irene Sanchez, Math Teacher
- Valley High School: Janet Bliss, Special Education
- West Mesa High School: Greg Banka, Science Chair

We believe our efforts at APS have been particularly effective because of the strong support of the Board, the close working relationship with Frank Sanchez, Superintendent, Betty Skupaka, Associate Superintendent for Instruction, John Mondragon, South Area Superintendent, and Mary Ann Esquibel. We look forward to increasing activity with APS in 1984-85 as we develop the program at Cibola, Del Norte, and Highland High Schools, each of which has a student body at least thirty percent minority. Table 3 summarizes MESA data.

II. UNM UNDERGRADUATE PROGRAM

A. Hispanic

1. The Hispanic Engineering Professional Advisory Committee (HEPAC):

Dr. Don Diego Gonzales, Chair HEPAC serves as the major HEO support. Its members serve as mentors to assist individual Hispanic students.

2. The Hispanic Engineering Organization (HEO):

HEO is composed of undergraduate and graduate Hispanic students. Monthly HEO meetings feature speakers from

UNM CENTER - PATRICK LOPEZ, DIRECTOR

NMMESA

STUDENT BREAKDOWN BY SCHOOL, ETHNICITY, GRADE & SEX

	GRADE	BLACK AM.		AM. INDIAN		HISPANIC		OTHER		TOTAL	
		MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
A. Albuquerque Public Schools											
1. Albuquerque High School (Jill Snyder, Advisor)	9	1	2	1	0	4	2	1	0	7	4
	10	0	0	1	0	9	7	0	1	10	8
	11	0	0	0	0	2	1	0	0	2	1
TOTAL		3		2		25		2		32	
2. Manzano High School (Donna Caluss, Advisor)	9	2	0	2	0	9	3	5	0	18	3
	10	0	0	0	0	4	9	0	1	4	10
	11	1	0	0	0	0	0	0	0	1	0
		3		2		25		6		36	
3. Rio Grande High School (Irene Sanchez, Advisor)	9	0	0	0	1	7	15	0	0	7	16
	10	0	0	1	0	2	8	0	0	3	8
	11	0	0	1	0	0	1	0	0	1	1
	12	0	0	1	0	0	0	0	0	1	0
		0		4		33		0		37	
4. Valley High School (Janet Bliss, Advisor)	9	0	0	0	0	10	5	0	0	10	5
	10	0	0	2	0	12	4	1	0	15	4
		0		2		31		1		34	
5. West Mesa High School (Greg Banka, Advisor)	9	0	0	1	1	10	11	1	3	12	15
	10	1	2	0	0	13	11	0	0	14	13
	11	0	1	1	0	2	4	0	1	2	7
	12	1	0	0	1	0	4	0	0	1	5
		5		4		55		5		69	
		11		14		169		14			
		5%		7%		81%		7%			

APS Total: Male 108

Female 100

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various areas of industry with emphasis on study skills, time management, and career opportunities. During UNM breaks, HEO students visited high schools throughout New Mexico to meet with students to encourage them to effectively prepare for college.

HEO conducts individual and group tutoring in Farris 345. Table 4 shows Hispanic enrollment at UNM/COE from 1975-76 to 1983-84. Table 5 shows Hispanic B.S. degree recipients at UNM from 1975-76 to 1983-1984. In 1983-84, Hispanic students earned 13.2% of B.S. degrees awarded.

B. The Native American Program/College of Engineering (NAPCOE):

NAPCOE conducts programs of recruitment and retention to increase the number of American Indian students earning B.S. degrees in engineering. NAPCOE works closely with Sandia Lab's Indian Outreach Committee to provide tutoring, counseling, mentors, and role models for Native American students. The program also conducts individual and group tutoring in UNM's College of Engineering, Farris 345. The program director, Lila Bird, works closely with the Financial Aid Office to assure maximum support for each student. She also provides counseling for personal and academic problems.

The students held a spring dinner to honor the two 1983-84 NAPCOE graduates Al Montoya and Emerson Eskeets.

Student study groups make constant use of the NAPCOE student room for tutoring and studying. Three NAPOCE students earned B.S. degrees: One in Mechanical Engineering, one in Civil Eningeeing, and one in Math.

The Directors visited schools statewide to talk with students, teachers, parents, and administrators. They also hosted groups of high school students visiting the UNM campus.

Tables 6 & 7 show UNM/COE enrollment by ethnicity for the Fall 1983 and Spring 1984 semesters.

C. Tutoring:

Tutoring for all engineering freshmen is available daily from 9:00 to 4:00 in the Engineering Annex. Upperclassmen are hired as tutors at a cost of $4,000 per year (2,000 from NASA, blaance from Special Programs). Students use the program an average of 250 tutor hours per week. Additional tutoring is available through HEO and NAPCOE.

TABLE 4

Total Hispanic Enrollments
UNM/COE 1976-1984 (Fall)
Includes Part Time

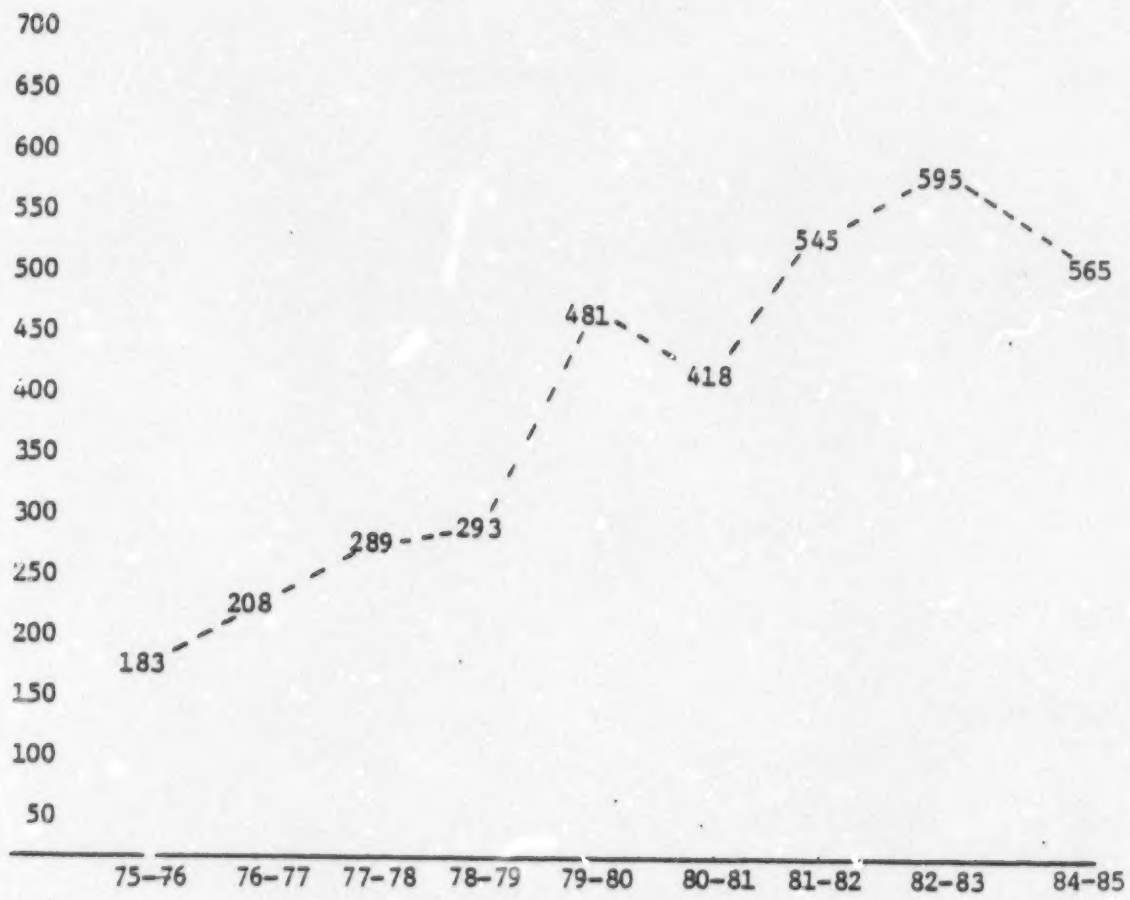
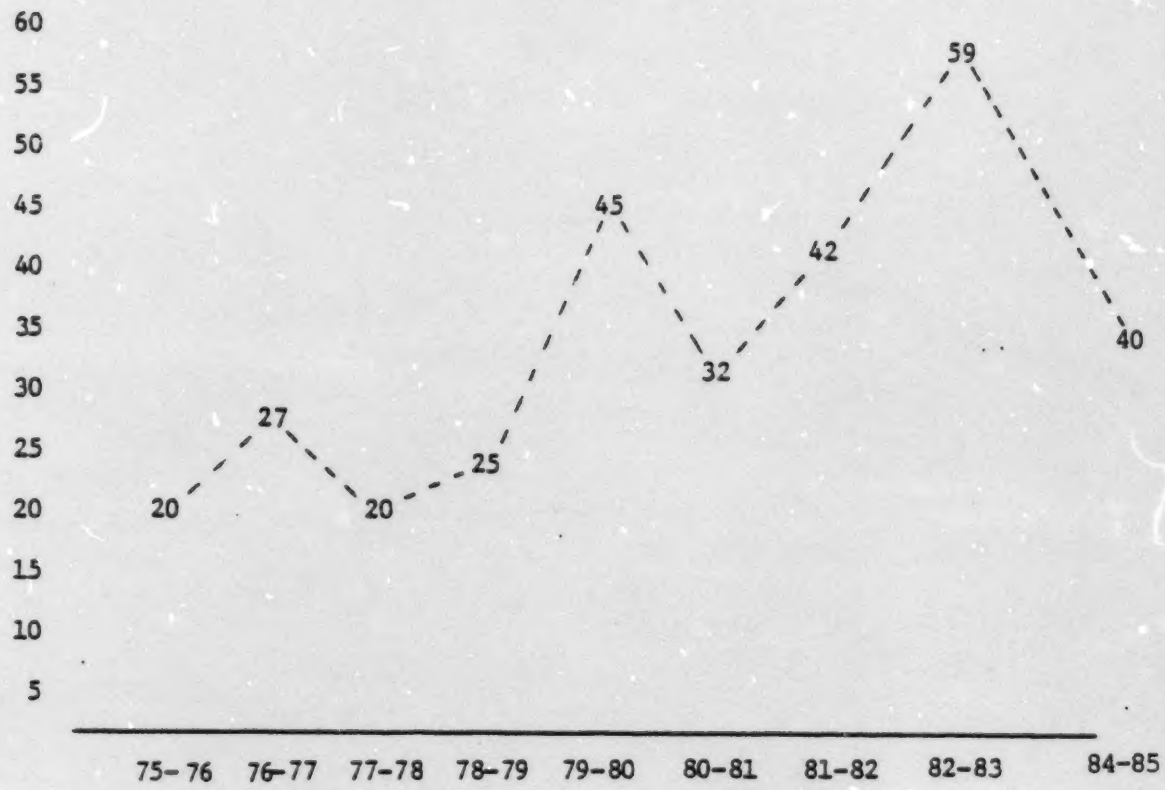


TABLE 5

Hispanic B.S. & B.E. Recipients
UNM/COE 1975-1984



D. Administration:

James Curtis Shorty, Director of NAPCOE, resigned in October 1983. Lila Bird was hired in January, 1984 to assume full-time directorship of NAPCOE. Cathie Gallegos, Special Programs Secretary, resigned on October 16, 1983. Debbie Carrao was hired to replace her on December 12, 1983. Lisa Poyer was hired on February 13, 1984 to replace her. Mary Susan Donaldson, NAPCOE secretary, resigned on February 2, 1984. Natalie Sandoval was hired on March 19, 1984 as secretary to NAPCOE and MESA.

TABLE 6

FULL TIME STUDENTS UNM/COE - FALL 1983

	MALE	FEMALE	TOTAL	PERCENTAGE
BLACK:				
Freshman	12	1	13	(1.2)
Sophomore	0	1	1	(0.6)
Junior	3	1	4	(1.1)
Senior	4	0	4	(0.8)
	19	3	22	(1.0)
AMERICAN INDIAN:				
Freshmen	22	9	31	(2.9)
Sophomore	3	0	3	(2.0)
Junior	8	1	9	(2.5)
Senior	3	2	5	(1.0)
	36	12	48	(2.6)
HISPANIC:				
Freshmen	165	65	230	(21.2)
Sophomore	18	11	29	(19.2)
Junior	71	23	94	(25.9)
Senior	72	26	98	(18.8)
	326	125	451	(21.3)
Minority Total:	381	140	521	(24.6)
OTHER:				
Freshmen	572	237	809	(74.7)
Sophomore	93	25	118	(78.1)
Junior	198	59	257	(70.6)
Senior	344	71	415	(79.5)
	1207	392	1599	(75.4)
TOTAL:	1588	532	2120	

Freshmen:	1083	(51.1)
Sophomore:	151	(7.1)
Junior:	364	(17.2)
Senior:	522	(24.6)
	2120	

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TABLE 7

FULL TIME STUDENTS UNM/COE - SPRING 1984

	MALE	FEMALE	TOTAL	PERCENTAGE
BLACK:				
Freshmen	10	1	11	(1.3)
Sophomore	2	0	2	(1.0)
Junior	4	0	4	(1.1)
Senior	5	0	5	(0.6)
	21	1	22	(1.0)
AMERICAN INDIAN:				
Freshmen	18	3	21	(2.4)
Sophomore	4	2	6	(2.9)
Junior	4	2	6	(4.0)
Senior	13	2	15	(1.9)
	39	9	48	(2.1)
HISPANIC:				
Freshmen	127	50	177	(20.3)
Sophomore	36	6	42	(20.0)
Junior	59	23	82	(22.1)
Senior	97	36	133	(16.5)
	319	115	434	(19.2)
Minority Total:	379	125	504	(22.3)
OTHER:				
Freshmen	480	182	662	(76.0)
Sophomore	121	39	160	(76.2)
Junior	224	55	279	(75.2)
Senior	536	118	654	(81.0)
	1361	394	1755	
TOTAL:	1740	519	2259	

Freshmen:	871	(38.6)
Sophomore:	210	(9.3)
Junior:	371	(16.4)
Senior:	807	(35.8)
	2259	

1983-84 CORPORATE CONTRIBUTIONS

Funding Company	Total Contribution	Account
ABET	$ 5,000	MITE
Aluminum Co. of America	5,000	R & R
Amoco	1,500	Scholarships
ARCO	10,000	MESA
Digital	280	AISES
DOW Chemical	3,000	R & R
Dupont	3,000	R & R
Eastman Kodak	3,000	R & R
Eastman Kodak	3,000	NAPCOE
Exxon	6,000	NAPCOE
General Electric	10,000	R & R
Gulf Oil	1,500	R & R
Hewlett Packard	1,500	MESA*
Hewlett Foundation	35,000	MESA
Kerr-McGee	2,000	NAPCOE
Motorola	1,000	MESA
Phillips	2,000	R & R
PNM	5,000	MESA
Sandia National Labs	15,000	MESA
Utah International	1,500	NAPCOE
Salt Power Project	897	NAPCOE
TOTALS:	105,177	

* Ten HP/11 Calculators

CORPORATE CONTRIBUTIONS

ACCOUNT BREAKDOWN

ACCOUNT	FUNDING COMPANY	TOTAL CONTRIBUTION
MITE	ABET	$ 5,000
Total		$ 5,000
Recruitment & Retention	Aluminum Co. of America	$ 5,000
	DOW Chemical	3,000
	Dupont	3,000
	Eastman Kodak	3,000
	General Electric	10,000
	Gulf Oil	1,500
	Phillips	2,000
Total		$ 27,500
Scholarships	AMOCO	$ 1,500
Total		$ 1,500
MESA	ARCO	$ 10,000
	Hewlett Packard (calculators)	1,500
	Hewlett Foundation	25,000
	Motorola	1,000
	PNM	5,000
	Sandia National Labs	15,000
Total		$ 57,500
AISES	Digital	$ 280
Total		$ 280
NAPCOE	Exxon	$ 6,000
	Kerr-McGee	2,000
	Utah International	1,500
	Eastman Kodak	3,000
Total		$ 12,500
TOTAL CORPORATE CONTRIBUTIONS		$104,280

FEDERAL SUPPORT

Department of Defense	
AFITE	$ 25,000.00
Department of Energy	
PREP	21,788.43
Total Federal Support	$ 46,788.43
Total Corporate Support	104,280.00
TOTAL EXTERNAL FUNDS	$151,068.43